Modeling Sublimation from Ganymede

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A modeling effort is underway to calculate for Ganymede the magnitude of the neutral atmosphere source from sublimation. The surface of Ganymede can be assumed to be composed of water ice with contaminants. Sublimation is considered to occur via diffusion of vapor through an icy-particulate overlayer. The model is an integration of the 1-D heat conduction equation over a diurnal cycle, subject to a surface boundary condition and accounts for feedback due to sublimation effects. The thermal conductivity is assumed to be temperature dependent. The temperature distribution on the satellite surface, and the corresponding neutral water production rates, are calculated as a function of latitude and local hour angle. Preliminary results will be reported for varying thermal properties and albedos of the overlayer, where the layer is a fluffy H2O frost, a homogeneously mixed layer of ice and silicate powders, and an amorphous particulate ice.